SUSTAINABLE SILICON VALLEY

Sustainable Silicon Valley

2008 Annual Report

HEALTHY ENVIRONMENT • VIBRANT ECONOMY • SOCIALLY EQUITABLE COMMUNITY

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Looking east towards San Francisco Bay and the Dumbarton Bridge from Palo Alto's Foothill Park. Photo courtesy of Rick Row, Sustainable Silicon Valley, *www.SustainableSiliconValley.org*

California Academy of Sciences, San Francisco, CA. Undulating green roof of the LEED Platinum museum; roof designed by Renzo Piano and built by Webcor Builders. Photo courtesy of Webcor Builders, *www.webcor.com*

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" Corporate responsibility is an essential barometer of the current and future overall health of our company….we will never succeed alone (in taking care of the world around us). That's why we strive to cultivate and sustain effective working relationships with a broad universe of partners who are as committed as we are to making a difference."

Peter A. Darbee, Chairman and CEO, Pacific Gas & Electric Company, (from its 2007 Corporate Responsibility Report)

" When we try to pick out anything by itself, we find it hitched to everything else in the Universe."

John Muir, *My First Summer in the Sierra*. Boston: Houghton Mifflin, 1911

Sustainable Silicon Valley was selected for a Governor's Environmental and Economic Leadership Award in November 2007 for its "innovative and forward thinking approaches that reduce greenhouse gas emissions and mitigate the adverse effects of climate change on public health and our vast natural resources."

" Carbon neutrality misses the point. It's good for companies to invest in others' good deeds, but right now it's absolutely critical that companies invest in creating more sustainable versions of themselves."

Dave Douglas, Sun Microsystems vice-president, reported in Business Week, 2008

" We should not give in to those who say environmental goals should take a back seat until the economy improves…that's short-sighted thinking. Tough economic times mean we need more solar, more green jobs."

Arnold Schwarzenegger,
at Solar Power International Conference, Oct. 13, 2008, reported on www.salon.com

INTRODUCTION

Welcome to Sustainable Silicon Valley's 2008 Annual Report.

Sustainable Silicon Valley (SSV) is a unique partnership among businesses, community groups and governments leading the region toward a more sustainable future. This coalition is making sure that Silicon Valley's leaders in all sectors are taking action to address the region's most important environmental problems.

As we have described in previous reports, Sustainable Silicon Valley's first major initiative has focused on energy efficiency and carbon dioxide (CO_2) emissions reductions. From those facilities reporting data for each year from 2000 through 2007, Sustainable Silicon Valley's leading partners have successfully reduced their CO_2 emissions from electricity and natural gas consumption by an average 27 percent, compared with a regional decline of 12 percent for the same period. If matched by all entities in the State, California would have already realized the Global Warming Solutions Act (AB 32) 2020 goal of reducing greenhouse gas emissions to 1990 levels. These reductions have created significant cost savings, reduced risk in anticipation of a greenhouse gas cap and trade system, and improved brand value, all of which lead to a competitive edge in the marketplace. This report provides an update on their accomplishments.

The region, the state and even the nation, are experiencing an unprecedented increase in awareness and action on environmental issues. Issues such as energy efficiency, air quality and its links to public health, water supply quality and reliability, and the safety and appropriate disposal of consumer products, are becoming increasingly mainstream, as their links to social well-being and economic prosperity are becoming clearer. All of these issues are associated with the larger concept of sustainability—living and working in ways that ensure the long-term vitality of natural systems and the economy. Also described in this report are ten emerging sustainability trends in Silicon Valley.

But, despite some encouraging trends, more effort is needed. This report describes two proposed strategic initiatives that will help put Silicon Valley on a path to a more sustainable future. The first focuses on coordinating efforts to address climate change. The second focuses on developing a sustainability plan for Silicon Valley, by coordinating action on initiatives to address the top six environmental pressures identified in our environmental management system process.

These are challenging times. Despite financial challenges and changing political climates, the urgency of our task remains. We must address the most important environmental problems and embrace the most promising opportunities to ensure a healthy environment in a vibrant economy for our children and their children.

Bruce Paton
Chair of the Board,
Sustainable Silicon Valley

Jennifer Smith Grubb
Former Chair of the Board,
Sustainable Silicon Valley

Rick Row
Executive Director,
Sustainable Silicon Valley

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SUSTAINABLE SILICON VALLEY

Sustainable Silicon Valley is a voluntary partnership of business, government, academic, and non-governmental organizations collaboratively creating a more sustainable future for Silicon Valley. The Sustainable Silicon Valley CO_2 Emissions Reduction Initiative has set a goal of reducing CO_2 emissions in the Silicon Valley region 20 percent below 1990 levels by 2010.

Sustainable Silicon Valley partners pledge to help meet Sustainable Silicon Valley's regional target, set their own individual targets, report their progress, share information, and mentor one another. Partners and others have shared information at Sustainable Silicon Valley quarterly educational forums and monthly meetings, as well as provided information to Sustainable Silicon Valley's Energy Efficiency Guidebook for Small and Medium Businesses. The partnership has grown to include 97 organizations, with 66 of them reporting energy use for this report.

Sustainable Silicon Valley: Goals, Strategy, and 2007–2008 Activities

GOALS, STRATEGY & ACTIVITIES

Overview of Sustainable Silicon Valley

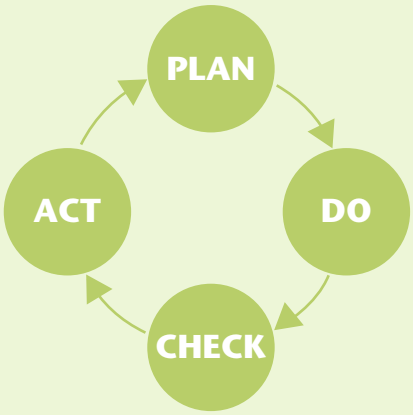
Sustainable Silicon Valley is a collaboration of nearly 100 businesses, governments, and non-governmental organizations addressing regional environmental sustainability.

Vision: Sustainable Silicon Valley envisions a thriving Silicon Valley with a healthy environment, a vibrant economy and a socially equitable community.

Mission: Sustainable Silicon Valley is leading the Silicon Valley community to a more sustainable future. We do this by engaging and collaborating with local government agencies, businesses, and community organizations to identify and help address the highest priority environmental issues in the Valley.

Sustainable Silicon Valley grew out of a special project started by the California Environmental Protection Agency. A regional Environmental Management System (EMS) was envisioned as a means to achieve better environmental outcomes in the Valley, beyond what could be obtained by the basic command-and-control regulatory framework. An EMS is simply a systematic approach to environmental management, which uses a "plan–do–check–act" loop to address environmental issues of concern. The organization or region first generates a **plan** with a clearly defined environmental goal(s). It then implements or **does** what is required to carry out the plan; then **checks** on its progress against the goal(s). Finally, it must **act** to improve the plan.

Figure 1. A Systematic Approach to Environmental Management



Pressures on the Valley

Through a systematic assessment of all environmental issues of concern, or pressures, Sustainable Silicon Valley and the Silicon Valley community identified 35 environmental pressures, and determined the following six to be the highest priorities:

- Use of energy from non-renewable sources measured by CO_2 emissions
- Use of fresh water
- Urban sprawl
- Habitat loss and fragmentation
- Use of non-renewable raw materials
- Discharges of toxic chemicals to the air

Sustainable Silicon Valley's Environmental Goals

Sustainable Silicon Valley's initial environmental goal was to reduce the regional CO_2 emissions to 20 percent below the 1990 level by the year 2010. This goal was announced publicly in April 2003, and the first group of Sustainable Silicon Valley partners officially pledged to join Sustainable Silicon Valley in March 2004 to work toward reaching this ambitious goal.

GOALS, STRATEGY & ACTIVITIES

By recruiting Silicon Valley organizations to voluntarily improve energy efficiency and increase the use of renewable energy sources, Sustainable Silicon Valley hoped the region would meet this goal.

Meanwhile, California's landmark Global Warming Solutions Act of 2006 (also known as Assembly Bill 32) has set a new goal that California-wide greenhouse gas emissions (GHG) be reduced to 1990 levels by 2020, and then Executive Order S-3-05 increased that goal to reductions of GHGs by 80 percent below 1990 levels by 2050.[1] Because 1990 data are not available for most organizations, it is helpful to re-frame the 2020 goal: for Silicon Valley to do its share of reaching 1990 levels of emissions (that is, 32.2 million tons of CO_2),[2] the Valley would need to reduce CO_2 emissions 12 percent below the 2000 emissions level of 36.4 million tons. Individual organizations will, of course, set their own targets according to what they perceive to be economically efficient for them, but collectively they should achieve around 12 percent to meet their "fair" share of the State target.

Sustainable Silicon Valley's Strategy

Sustainable Silicon Valley's strategy employs a number of principles of effective environmental management to accelerate the reduction of CO_2 emissions regionally:

- **Setting goals fosters continued progress.** Sustainable Silicon Valley recruits as partners businesses, governments, and non-governmental organizations who set their own voluntary goals to reduce their CO_2 emissions. This year, Sustainable Silicon Valley recruited 20 new partners.
- **Measurement and regional context provides feedback and serves as a reminder to stay on track.** Sustainable Silicon Valley's CO_2 *Emissions Reduction Reporting Tool* shows pledging partners their progress towards their CO_2 reduction goals.
- **People need relevant information and tools to take action.** At quarterly educational forums open to the community, experts present information about strategies and resources to reduce CO_2 emissions. Sponsors, typically organizations who are working to reduce resource consumption, set up tables at the events and provide additional guidance.

Attendees at a vendor's table at Sustainable Silicon Valley's April 2008 Educational Forum: GreenTeams—Employees Making a Difference.

- **Learning is a two-way exchange.** Sustainable Silicon Valley hosts monthly meetings that focus on specific and practical aspects of best practices in CO_2 emissions reduction, and provides opportunities for Sustainable Silicon Valley partners to share information about their energy-saving successes and challenges, as well as benefit from the knowledge of others.

[1] The California Air Resources Board is responsible for implementing AB32's greenhouse gas emissions reduction goals. A report on their progress is available at *http://www.arb.ca.gov/cc/cc.htm*

[2] The Silicon Valley portion was calculated assuming the Valley carried its share of the State burden: 12 percent=(2000 level−1990 level)/2000 level=(36.4m -32.2m)/36.4m=12 percent, which drops level back to 1990 level.

GOALS, STRATEGY & ACTIVITIES

- **Economic return encourages environmental projects.** Sustainable Silicon Valley's partners demonstrate that improving energy efficiency makes economic sense at current prices. Where the opportunities to improve energy efficiency appear to be cost prohibitive, Sustainable Silicon Valley makes energy efficiency incentive funds available to Sustainable Silicon Valley partners with qualifying projects, working in partnership with Pacific Gas & Electric Company (PG&E) and Silicon Valley Leadership Group (SVLG) under the SVLG Energy Watch program.
- **Celebrating achievements encourages further progress and inspires others to follow.** Sustainable Silicon Valley honors the commitment and successes of pledging partners by publicizing descriptive profiles in our monthly meetings, at quarterly forums, in this annual publication, in media opportunities, and at our annual event.

The CO_2 Emissions Reduction Initiative

Sustainable Silicon Valley launched its regional carbon dioxide (CO_2) Emissions Reduction Initiative (Initiative) in 2004 as a first step toward a vision of a region that thrives environmentally, economically, and socially. This Initiative will continue.

A basic element of Sustainable Silicon Valley's Initiative is to ask organizations to work in partnership by making a voluntary pledge (see page 38) to reduce their own CO_2 emissions, and Sustainable Silicon Valley supports them by providing an easy-to-use online reporting tool.[3] Partners identify participating facilities, specify a base year and target year, and then set an emission reduction goal from the base to target year. The main purpose of this pledge program is to encourage organizations to set their own CO_2 reduction targets, to voluntarily reduce their own CO_2 (and other greenhouse gas) emissions, and to monitor their progress against their targets.

" Global climate change will bring higher sea levels, more storm-caused flooding and marked ecosystem changes to the Bay Area. But just as we have done in meeting other challenges, our region can provide leadership and ideas that can be used around the world if we successfully integrate research, innovation, inspiration and cooperation into a long-range regional plan for dealing with climate change."

Will Travis, Executive Director, Bay Conservation and Development Commission

[3] SSV's online tool is available for use by the public at *http://www.sustainablesiliconvalley.org/tools.htm*. SSV acknowledges the support of the Santa Clara Valley Water District and Kent Haake for hosting, creating, maintaining and upgrading this tool.

GOALS, STRATEGY & ACTIVITIES

Sustainable Silicon Valley 2007-2008 Activities

Sustainable Silicon Valley's activities over the past year have focused on reducing regional CO_2 emissions by recruiting new organizations, and assisting organizations currently enrolled in the CO_2 Emissions Reduction Initiative. From 1990 to today, Sustainable Silicon Valley partners in aggregate have reduced CO_2 emissions by 850 thousand tons. This is equivalent to:

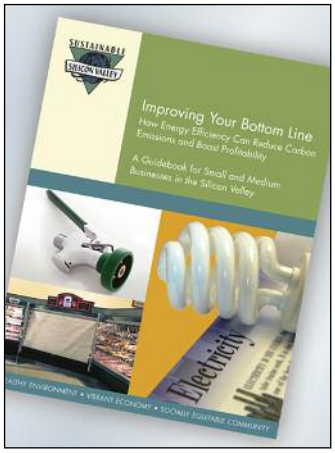
- Removing 141,000 cars off the road for a year, or
- Removing over 500,000 houses from the PG&E electric grid for a year

For those SSV partner facilities reporting energy use each year since 2000, CO_2 emissions have declined by 27 percent—more than twice the percentage decrease for the region during the same time.

Sustainable Silicon Valley's partners providing data from 2000 to 2007 for selected facilities have successfully reduced their regional emissions of CO_2 by percentages that, if matched across the State, would have enabled California's 2020 goal to have been met already.[4] Since these reductions are being pursued voluntarily, they should be beneficial for an organization's financial and social-responsibility profiles as well.

In addition, Sustainable Silicon Valley continues to encourage the adoption and sharing of the best practices for reducing carbon dioxide (CO_2) emissions among its partners. Sustainable Silicon Valley believes that by advancing the diffusion of technical and managerial knowledge among its partners, individually they can more efficiently and effectively reduce their greenhouse gases. In this vein, Sustainable Silicon Valley has a number of other new and on-going activities to share best practices:

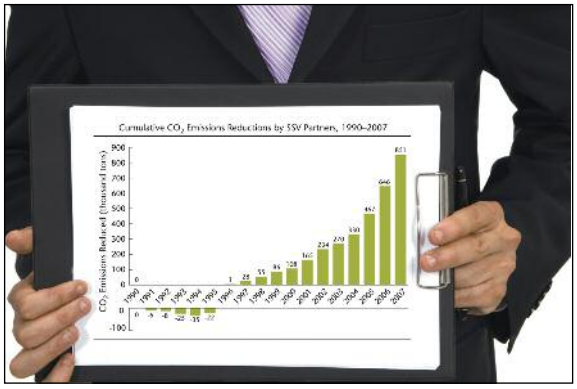
- **Targeting Small and Medium-Sized Enterprises (SMEs) for CO_2 Reductions:**
  A new project funded by a grant from the Bay Area Air Quality Management District provides small and medium businesses with a guidebook and training to cost-effectively start reducing their business's energy consumption and greenhouse gas emissions. With over 95 percent of the 50,800 businesses in Santa Clara County alone having fewer than 50 employees, targeting this group should deliver significant reductions. The guidebook, *Improving Your Bottom Line: How Energy Efficiency Can Reduce Carbon Emissions and Boost Profitability—A Guidebook for Small and Medium Businesses in the Silicon Valley*, is available on Sustainable Silicon Valley's website.



[4] Based on SSV's calculation, if the entire State had reduced its CO_2 emissions from electricity and natural gas consumption by 25 percent below 2000 levels, and transportation emissions were held constant, then California would have met AB 32's 2020 goal by now. Fifteen of our partners, in aggregate, have reduced their average emissions from 2000 to 2007 by 27 percent from reporting facilities, compared with a 12 percent reduction by the region as a whole.

GOALS, STRATEGY & ACTIVITIES

- **Nurturing Green Teams:** Many employees of Silicon Valley companies and local governments want to "do something" to make their workplaces greener; be more energy efficient, waste less paper, water and other resources, and reduce usage of hazardous chemicals. In a growing number of workplaces, employees—often with support of their management—are forming "green teams." In April 2008, Sustainable Silicon Valley hosted a forum with representatives of local green teams describing how their green teams are making a difference (see *http://www.sustainablesiliconvalley.org/docs/Green_Teams/index.htm*). Because green team leaders in different organizations have many best practices to share, Sustainable Silicon Valley hosted the first peer-to-peer meeting of green team leaders in Silicon Valley in September 2008. Sustainable Silicon Valley will host future green team events that will focus on Sustainable Silicon Valley's top issues, in addition to issues green team members volunteer for discussion.
- **Supporting Local Governments:** Several local governments have joined Sustainable Silicon Valley in the past year, as part of a collaboration among Sustainable Silicon Valley, Joint Venture Silicon Valley Network, and ICLEI-Local Governments for Sustainability USA. Sustainable Silicon Valley is supporting local governments to develop climate action plans and monitor their progress through Sustainable Silicon Valley's annual reporting process. The July Sustainable Silicon Valley forum, featuring Sandra Goldberg, Deputy Attorney General for the State of California, focused on local governments reducing greenhouse gases.
- **Hosting Educational Forums and Facilitating Networking Among Peers:** Sustainable Silicon Valley hosts presentations on practical topics, facilitates audience dialog with the experts, and provides opportunities to network. Past presentations are available on Sustainable Silicon Valley's web site. Select speakers included: Nancy Whalen, Director of Marketing, California Climate Action Registry, Brian Gitt, former CEO and Executive Director of Build It Green, and Libby Reder, Program Manager, Global Citizenship of eBay. (In part, these meetings support the Silicon Valley Leadership Group's Energy Watch program, which is funded by PG&E).[5]



" Sustainable Silicon Valley offers local companies, organizations and municipalities the opportunity to gather and discuss our common challenges. Employees across our organization—from Facilities to our Green Team—have found SSV events to be useful, actionable AND enjoyable."

Libby Reder, Environment Program Manager, Global Citizenship, eBay Inc.

[5] SSV makes energy efficiency incentive funds available to SSV partners with qualifying projects, working in partnership with Pacific Gas & Electric Company (PG&E) and Silicon Valley Leadership Group (SVLG) under the SVLG Energy Watch program.

Photograph courtesy of R. Row

Sustainable Silicon Valley Pledging Partners

PLEDGING PARTNERS

Introduction to Pledging Partners

The pledging partners of Sustainable Silicon Valley are listed on pages 12 and 13. Each has signed a voluntary pledge (see page 38) to set internal goals for CO_2 emissions reduction and to report annually to Sustainable Silicon Valley on their progress for specified facilities.

Organizations that join Sustainable Silicon Valley as pledging partners enjoy a range of benefits including:

- Quarterly Educational Forums on topics of concern to organizations working to reduce energy use and CO_2 emissions.
- Ongoing exchange of best practices related to cost effectively achieving greater energy efficiency, and reducing CO_2 emissions at monthly meetings and through direct contacts within the community of Sustainable Silicon Valley partners.
- Public recognition, such as that bestowed this past year on Sustainable Silicon Valley and its partners with the 2007 Governor's Environmental and Economic Leadership Award.
- Inclusion in the Sustainable Silicon Valley Annual Report, which highlights partner achievements in the context of Silicon Valley trends.
- Media attention, which has included business section coverage in the San Jose Mercury News, KGO/ABC7 television evening news and other programming, and interviews on various radio stations.
- Nomination by Sustainable Silicon Valley for honors and recognition.
- Affiliation with other prominent Silicon Valley organizations in an internationally recognized, regional effort to address collaboratively the environmental concerns of your organization and the regional community.
- Access to Energy Efficiency Incentive Funds through an agreement with PG&E that makes energy efficiency incentive funds available to qualifying Sustainable Silicon Valley Partners and Silicon Valley Leadership Group (SVLG) members.

The individual achievements of Sustainable Silicon Valley's partner organizations are as impressive as the aggregated achievements summarized in the previous section. Sustainable Silicon Valley invites you to sample their achievements in this printed report, and then visit the online version to read fuller reports of the partners and find links to related information on their own websites.

Visit the online version of this report where you will find links to the full reports of the partners, and to related information on their own websites. *www.sustainablesiliconvalley.org*.

PLEDGING PARTNERS

- 3 Degrees° Group
- Acterra
- Adobe Systems
- Advanced Micro Devices
- Agilent Technologies
- Akeena Solar
- Applied Materials
- Bay Area Air Quality Management District
- BD Biosciences
- BigFix Inc.
- Calpine Corporation
- Cargill Salt
- CH2M Hill
- Cisco Systems
- City of Belmont
- City of Brisbane
- City of Burlingame
- City of Campbell
- City of Cupertino
- City of East Palo Alto
- City of Foster City
- City of Los Altos
- City of Milpitas
- City of Morgan Hill
- City of Mountain View
- City of Pacifica
- City of Palo Alto
- City of Redwood City
- City of San Bruno
- City of San Carlos
- City of San José
- City of San Mateo
- City of Santa Clara
- City of Saratoga
- City of South San Francisco
- City of Sunnyvale
- Communications & Power Industries
- County of San Mateo
- County of Santa Clara
- County of Santa Cruz
- CV Therapeutics
- Dharma Merchant Services
- Earth Bound Homes
- eBay
- ESP
- ETM Electromatic
- Fenwick and West
- Foothill-DeAnza Community College District

PLEDGING PARTNERS

Franklin Templeton Investments

Glumac

Great Mall

Grove & Associates

Hewlett Packard

Integrated Archive Systems

Integrated Design Associates

Intel

Kuehne Construction

LifeScan

LJ Engineering

Lockheed Martin Space Systems Company

Minerva Consulting

NASA Ames Research Center

NetApp

Northrop Grumman Marine Systems

Our City Forest

Pacific Gas and Electric Company

Palo Alto Research Center

Palo Alto Unified School District

Quadrus Office Complex

RMC Water & Environment

Roche Palo Alto

San Francisco International Airport

Santa Clara University

Santa Clara Valley Transportation Authority

Santa Clara Valley Water District

Schering-Plough Biopharma

Seagate Technology

Serious Materials

Sierra Club Loma Prieta Chapter

Silicon Valley Leadership Group

Silicon Valley Microelectronics, Inc.

Specialty Solid Waste & Recycling

Sun Microsystems

SunPower Corporation

Sustainable San Mateo County

Symantec

Tarlton Properties

The Tech Museum of Innovation

Town of Atherton

Town of Colma

Town of Los Altos Hills

Town of Los Gatos

Town of Portola Valley

Town of Woodside

Toyota Sunnyvale

Watt Stopper/Legrand

Webcor Builders

Sustainable Silicon Valley Partners 2007-2008 Report: CO_2 Emissions Reduction Initiative

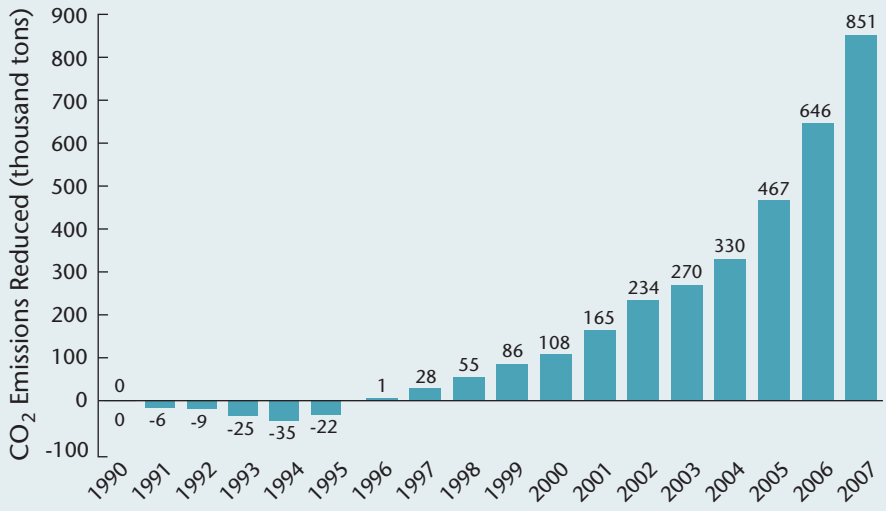
PARTNERS CO_2 REPORT

Introduction

You can't manage what you don't measure.

Sustainable Silicon Valley's Partner CO_2 Emissions Reduction Initiative assists organizations in reducing their greenhouse gases (GHG) emissions. During the past year, 20 new organizations joined for a total of 97 Sustainable Silicon Valley partners, and total annual GHG emissions were reduced by 205 thousand tons. Since 1990, Sustainable Silicon Valley partners' cumulative emissions reductions have totaled 851 thousand tons of CO_2 (illustrated in Figure 2). This is equivalent to removing 141,000 cars off the road for a year, or removing over 500,000 houses from the PG&E electric grid for a year.[6]

Figure 2. Cumulative CO_2 Emissions Reductions by SSV Partners, 1990–2007



Yearly aggregated CO_2 emissions reductions for all Sustainable Silicon Valley partners. Emissions reductions are measured as the difference between each facility's reported yearly emissions and that facility's baseline emissions.

Partners Demonstrate California's 2020 GHG Emissions Goal is Reachable

A subset of partners' data that shares a common reporting period and set of facilities provides a clear view of CO_2 reduction possibilities over time. Fifteen partners have reported data on 36 facilities and fleets for the years 2000-2007.[7] The emissions reduction achieved among these fifteen partners in 2007 is 27 percent below their 2000 emissions.[8] The emission reductions of Sustainable Silicon Valley partners demonstrate the emission reduction potential for the region. Silicon Valley could readily meet and exceed the state's target to meet 1990 emission

[6] Cars off the road were calculated with US EPA's Greenhouse Gas Equivalencies Calculator *http://www.epa.gov/cleanenergy/energy-resources/calculator.html*; houses off the grid were calculated on Pacific Gas and Electric Company's ClimateSmart calculator *http://www.pge.com/myhome/environment/calculator/*.

[7] The partners with data from 2000-2007 are: Acterra, City of Santa Clara, City of Sunnyvale, County of Santa Clara, Cushman and Wakefield at Adobe, CV Therapeutics, Foothill DeAnza Community College District, Integrated Archive Systems, Lockheed Martin Space Systems, NASA Ames Research Center, Northrop Grumman Marine Systems, Palo Alto Research Center, Roche Palo Alto, Santa Clara Valley Water District, and Schering-Plough Biopharma.

[8] SSV compared regional reductions achieved in electricity and natural gas usage from 2000-2007 with emissions reductions achieved by SSV partners from those two sources without including carbon offsets or renewable energy credits. Regional emissions from electricity and natural gas have declined 12 percent from 2000 to 2007 compared to 27 percent decrease by SSV partners.

PARTNERS CO_2 REPORT

levels by 2020 if most organizations were to follow the examples of these Sustainable Silicon Valley partners. The next two sections describe the measures partners took and the financial and environmental benefits they accrued through their CO_2 reduction measures.

Sustainable Silicon Valley Partners: Sources of CO_2 Reductions

Sustainable Silicon Valley partners achieve the bulk of their energy and carbon reductions through energy conservation, energy efficiency and on-site use of renewable energy.

Areas Frequently Targeted for CO_2 Reductions by Sustainable Silicon Valley Partners

- Lighting
- Heating, Ventilation, and Air (HVAC) retrofits
- Motors
- Energy Sources
- Equipment Efficiency
- General Maintenance
- Monitoring and Controls
- Transportation and Fleets
- Employee Commutes
- Roofing
- Behavioral Changes
- Waste Reduction

New eBay Inc. building in San Jose that has been designed and built to the U.S. Green Building Council's Gold LEED standard.

Almost every Sustainable Silicon Valley partner has made changes in lighting, and those with new or renovated buildings, such as IDeAS and eBay, are harvesting daylight to reduce the need for artificial lighting. Most partners also have made improvements in heating and cooling: CVT, Great Mall, Intel, Lockheed Martin, NetApp, Northrop Grumman, and Santa Clara University all report improvements in HVAC monitoring, controls, or equipment changes.

Municipalities are also benefiting from energy efficiency improvements in HVAC systems, lighting, and cool roofs. The Cities of Morgan Hill, Mountain View, Los Gatos, and Santa Clara report energy savings that have resulted from improvements in HVAC equipment or controls. The Cities of Foster City, Mountain View, and Saratoga are installing high-efficiency street and traffic lighting to reduce emissions. Foster City's new street lights use roughly 35 percent less energy than the older versions, and new light-emitting diodes (LED) traffic lights use 20 percent less energy than older signals.

Fleets offer opportunities for energy savings and CO_2 emission reductions in the municipalities of Foster City, Mountain View, Santa Clara, Los Gatos, and at the Bay Area Air Quality Management District. These governments are retiring old vehicles, switching to hybrid cars and biodiesel trucks, making adjustments to patrol cars to avoid the need for idling, and the Air District has purchased a fleet of bicycles for work-related travel.

Silicon Valley Microelectronics now uses Toyota Prius hybrid vehicles for local deliveries rather than delivery vans. The Prius gets 55 mpg in the city, compared with only 14 mpg averaged by the vans.

PARTNERS CO_2 REPORT

While all partners describe measures to reduce energy usage, an increasing number are also purchasing renewable energy credits and carbon offsets. From 2002 to 2006, only two percent of Sustainable Silicon Valley partners offset their emissions. From 2006 to 2007, the purchase of renewable energy credit and carbon credit offsets rose to just below six percent of the total partner emission reductions for that year.

Double Green IT

In July 2007, SSV Partner Symantec deployed a custom power management profile on company PCs. Systems go into standby mode after four hours of inactivity, saving them approximately $800,000 (annually) and more than 6 million kWh of energy per year.

http://www.symantec.com/content/en/us/about/media/SYM_CR_ExecSummary.pdf

Sustainable Silicon Valley Partner Successes: What's Working?

We surveyed Sustainable Silicon Valley partners to learn about the critical elements of their successful CO_2 emission reductions. Here are a few of their success stories, more are available in the expanded web version of this report.

Cross-departmental Green Team with an Executive Sponsor

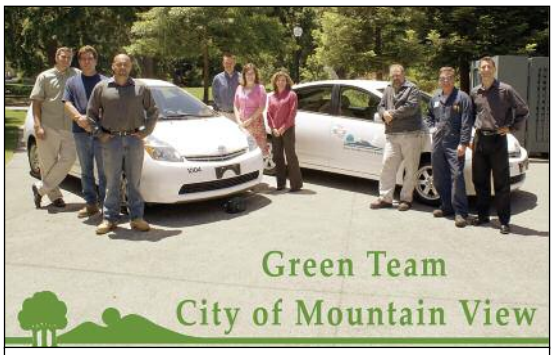
NetApp, creator of innovative storage and data management solutions, is exemplary within the high tech industry for its forward-looking environmental practices. NetApp is saving a total of 7 million kWhs annually, or approximately $1 million a year through their cumulative energy retrofit projects of the last few years.

To reduce energy-wasting mixing of supply air from, and return air to, the HVAC units at its Sunnyvale data center, NetApp has implemented the simple solution of hanging vinyl curtains to create barriers between these cold and hot air streams.

In late 2007, NetApp started an Environmental Responsibility Team, dubbed the Green Team, which began implementing measures to reduce NetApp's CO_2 footprint and overall environmental impact. The Green Team has an executive sponsor who is charged with bringing departments together from across the company and communicating the results back to the CEO. Ralph Renne, Director of Site Operations for NetApp, says that one of the benefits of a cross-departmental Green Team is that it provides a broad perspective of a company's environmental activities, and provides a perspective of how actions across the company add up to a significant positive impact. In addition, opportunities for sharing best practices and leveraging resources between departments arise.

PARTNERS CO_2 REPORT

Prioritizing GHG Reduction Measures



Some of the City's "Green Team" members standing near two City hybrid vehicles. From left to right: Noah Downing, Jim Baldinger, Rene Munoz, Eric Anderson, Sue Smith, Jessica von Borck, Chris Hartje, Skip Gildea, and Steve Attinger.

The City of Mountain View, home to nearly 74,000 people in Santa Clara County, has successfully engaged its community to respond to climate change. The City formed an internal 20-member Green Team, representing all City departments, to recommend improvements in City operations and at City facilities to increase sustainability. Faced with prioritizing 130 recommendations from the Green Team and 89 more recommendations from a community Task Force, the City will use a quantitative methodology for measuring the financial and environmental costs and benefits of different sustainability projects. This methodology calculates a cost-effectiveness factor that provides the cost or savings associated with avoiding one ton of CO_2 per year over a project's life.

Example: What is the cost-effectiveness factor for a lighting retrofit?
Assume a city pays $30,342 (minus a $7,479 utility rebate) to retrofit the Police administration building with high efficiency lighting (T-12s to T-8s). Estimated annual dollar savings are $17,948, and annual energy savings are 139,350 kWh, which translate into an annual CO_2 reduction of 29 tons. Assume the life of the product is 4.3 years.

The normalized cost-effectiveness is: $22,863 (City's cost of the retrofit)–($17,948 (annual energy savings)*4.3 (life of product))/(29 tons (annual CO_2 reduction)*4.3 (life of product)= $434 in savings to avoid one ton of CO_2.

Sustainability in a Recession
Steve Attinger, the City of Mountain View's Environmental Sustainability Coordinator, firmly believes that, "Sustainability becomes more compelling the tighter the finances." He sees many opportunities for realizing quick financial returns, particularly because there are so many cost-effective opportunities to reduce energy use without hindering operations. For example, turning off lights costs nothing and reduces operating costs immediately, and lighting retrofits generally have a payback of a few months to one to three years, and continue to deliver cost savings year after year. As Steve enthusiastically frames it, "We can easily save the City money doing this, and create a healthier community and environment at the same time."

In a recent survey of its partners conducted by Sustainable Silicon Valley, four out of five respondents said that the current economic crisis would have no impact on their plans to install renewable energy or implement energy retrofits. Two partners said that the crisis would actually accelerate implementation of their energy efficient retrofits and the purchase of more fuel efficient vehicles.

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Executive Commitment Justifies Longer Pay-back Periods

Lockheed Martin Space Systems Company's facilities in Sunnyvale and Palo Alto reflect the company's outstanding commitment to minimizing its impact on the environment. The facilities showcase an impressive array of energy-efficient equipment, photovoltaic systems, and new LEED[9] certified buildings. Also, there is a corporate-wide "Go Green" Team.

Lockheed Martin's Green Team members, left to right Kaushik Amruthur, Architect; Carl Levy, Energy Manager; Transon Hum, Controls Engineer; and Jennifer Paedon, Commute Alternatives Coordinator.

Carl Levy, Energy Manager for Sustainable Silicon Valley partner Lockheed Martin, said that securing approval for capital expenditures for CO_2-reducing activities stems partially from a top-down commitment, starting with Lockheed Martin CEO Robert Stevens and his commitment to greening their corporation, to their Space Systems VP of Operations, S.K. Gupta, and his "aggressive goal to reduce the company's carbon footprint." This commitment makes a significant difference when evaluating long payback periods on renewable energy installations. Lockheed Martin enjoys a low electricity rate, purchasing transmission-level power, and therefore solar energy is an expensive proposition. Nevertheless, they are moving forward with installation of renewable energy in their facilities because, as Carl says, "It's the right thing to do."

No Return on Investment (ROI) on Carbon Offsets

Lockheed Martin evaluated the cost of offsetting their corporate carbon footprint, and found that it would cost approximately $50 million. As Carl Levy, Energy Manager says, "Installing photovoltaics lead to absolute reductions," and so are a better alternative to buying offsets. Therefore, by making investments in energy efficiency and renewable energy, they enjoy a financial return on their investment and reduced emissions. Reducing one's carbon footprint also makes additional sense in light of any future GHG regulations that might tax those emissions.

LEED Cost-Saving Practice

A novel practice implemented by Lockheed Martin to save costs for green building was to hire a lead architect to rewrite all their construction standards and guidelines to align with the LEED silver standard. A new transportation building at Lockheed Martin's facility in Sunnyvale is the first LEED building in that city. Contrary to a widely held belief that green construction is significantly more expensive than conventional buildings, the "green premium" of the Sunnyvale structures was only about 1.5 percent. "When they're designed well, green buildings are very competitive on initial cost, and they have lower operating costs by using less energy and water," says Kaushik Amruthur, Senior Facilities Engineer.

[9] The U.S. Green Business Council operates the Leadership in Energy and Environmental Design (LEED) Green Building Rating System™. LEED certification provides independent, third-party verification that a building project is environmentally responsible, profitable and a healthy place to live and work. See *http://www.usgbc.org* for details.

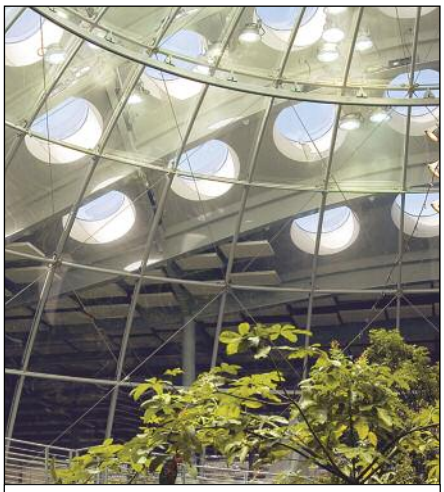
PARTNERS CO_2 REPORT

Breaking Down Barriers to Further CO_2 Emission Reductions

Sustainable Silicon Valley has observed a range of barriers to accelerating the diffusion and adoption of energy-efficient technologies to the tens of thousands of organizations in Silicon Valley. For example, lack of information or misinformation is common, and so Sustainable Silicon Valley conducts extensive public information outreach to lower this barrier. Other barriers may be political, social, financial, or embedded in management practices.

Industry often calls for a short (less than three years) payback period for energy-efficiency investments. This is one of the significant barriers to faster and more systemic energy-efficiency improvements in Silicon Valley and elsewhere. Conversations with several Sustainable Silicon Valley partners in the last year suggest that they may be rejecting energy-efficiency projects that would offer above market rates of return because these organizations are requiring payback periods—that is the time in years which the capital investment in a project is returned through cost savings—of two years or less. A short payback criterion suggests that an organization perceives it has a strong portfolio of capital investment alternatives; or that it is short of cash or other resources to take advantage of the above-market rate energy-saving investments available to it.

Sustainable Silicon Valley encourages all organizations in Silicon Valley to consider that "…the CO_2 generated by energy use in buildings—a third of the global total of man-made CO_2 emissions—could be cut by almost 30 percent in little more than a decade. The technology to achieve this already exists… What's more, future energy savings means most of such spending would **pay for itself in three to seven years**.[10]" Sustainability entails planning for the long-term, and our financial systems also need to reflect that system condition.



Webcor Builders used their concrete expertise to create many one-of-a-kind structures for the new Academy of Sciences facility in San Francisco. The facility is expected to earn Platinum-level LEED certification from the U.S. Green Building Council.

Other barriers that have been recognized by Sustainable Silicon Valley include a lack of accurate data on the cost or performance of energy efficient buildings and distorted energy price signals. Future efforts with partners will include developing methods for overcoming these and other barriers.

Beyond CO_2 Emission Reductions

Many Sustainable Silicon Valley partners volunteered information in our annual survey about programs they were undertaking that went beyond CO_2 emission reductions, such as recycling programs and water conservation measures on site. Partners also volunteered information about programs to reduce environmental impacts that reach beyond their facility doors.

[10] Giles, Jim. "Building for a Cooler Planet." *New Scientist*, 25 July 2007.

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From small organizations to global corporations, Sustainable Silicon Valley partners are instituting green purchasing policies, and designing products for greater energy efficiency and reduced use of raw materials.

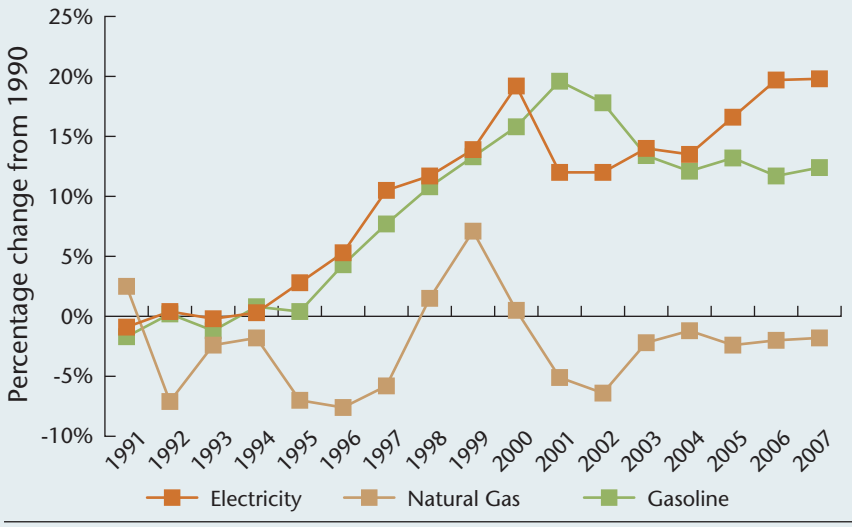
Sustainable Silicon Valley partners are setting corporate goals for items such as:

- locally-sourced products (e.g., ensuring supply chain is local),
- waste (e.g., 85% diversion rate),
- organically certified products (e.g., cafeteria is certified green),
- vehicle miles traveled (VMT) (e.g., tracking car and air miles), and
- water consumption (e.g., 10% reduction in gallons per year consumed).

Regional Context: Silicon Valley Energy Use and CO_2 Emissions

Electricity and gasoline consumption in the four-county Silicon Valley region (Santa Clara, San Mateo, Santa Cruz, and Alameda Counties) trended upwards from 1990 to 2000, then leveled off, while natural gas consumption has remained fairly constant (see Figure 3 below).

Figure 3. Energy Consumption in the Silicon Valley, 1991-2007



Percentage change in electricity, natural gas, and gasoline consumption in the Silicon Valley region, 1991 to 2007 (Santa Clara, San Mateo, Alameda, and Santa Cruz Counties). Data sources: California Energy Commission and California Department of Transportation.

The annual CO_2 emissions resulting from the consumption of gasoline, electricity, and natural gas in the four-county Silicon Valley region have risen by a net 5 percent from 1990 to 2007.[11] They would have risen by around 11 percent, were it not for the fact that CO_2 emissions per unit of electricity declined over this period.[12]

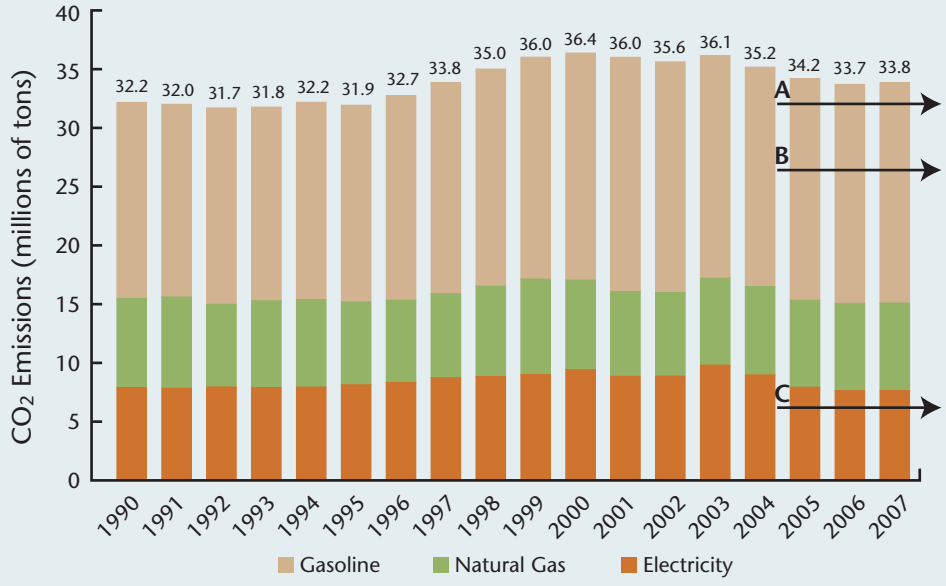
[11] Electricity conversion factors depend on the year due to the variability in generation sources. Factors were provided by Pacific Gas and Electric Company for 2003-2007 in personal communication.

[12] CO_2 emissions declined from 0.62 lbs/kWh in 2003 to 0.46 lbs/kWh in 2006 due to changes in PG&E's energy sources.

Also it may be noted in Figure 4 (below) that:

- CO_2 emissions from gasoline, natural gas, and electricity consumption peaked in 2000, a year of peak income in Silicon Valley, and have since declined by 7 percent from 2000 to 2007. However, since 2000 CO_2 emissions from gasoline consumption alone declined by 3 percent, while emissions from natural gas and electricity declined 12 percent.
- In every year since 1990, gasoline consumption has accounted for over 50 percent of the CO_2 emissions for the region.
- If regional CO_2 emissions reductions are to do their proportional share of helping California reach its 2020 target of falling to 1990 levels (as required under the California Global Warming Solutions Act of 2006) they will need to fall to the point marked by *Arrow A*. Similarly, emissions would need to fall to the point marked by *Arrow C* by 2050 to meet Governor Schwarzenegger's target of an 80 percent reduction under Executive Order S-3-05. *Arrow B* marks Sustainable Silicon Valley's own target of a 20 percent reduction from the 1990 level by 2010.

Figure 4. CO_2 Emissions in the Silicon Valley, 1990-2007



CO_2 emissions in the Silicon Valley region (Santa Clara, San Mateo, Alameda, and Santa Cruz Counties). Energy usage data sources: California Energy Commission and California Department of Transportation. Arrow A indicates the point at which the region will need to be to meet the AB32 goal of reaching 1990 levels by 2020. Arrow B indicates Sustainable Silicon Valley's goal of a 20 percent reduction in emissions by 2010, based on 1990 levels. Arrow C indicates the point at which the region will need to be by 2050 to meet the Governor's Executive Order S-3-05 goal of making an 80 percent reduction in CO_2 emissions.

As illustrated in Figure 5, gasoline accounted for 55 percent of total regional CO_2 emission in 2007, well above the national average of approximately 32 percent.

Driving alone is the largest contributor to the region's CO_2 emissions from gasoline. In Silicon Valley, it seems that even the most concerned citizens are continuing to drive alone, and drive more. In Santa Clara County, 78 percent of commuters drove alone in 2007, up

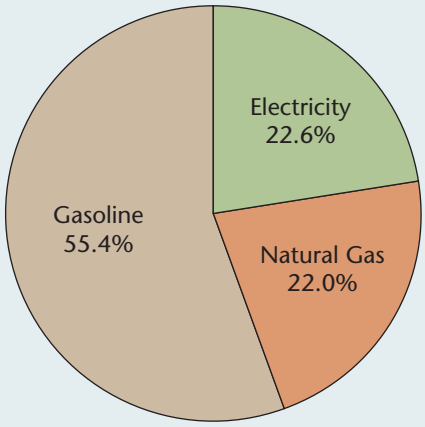
PARTNERS CO_2 REPORT

one percent from 2000, with urban sprawl being identified as one of the main contributors (see Figure 6). Recently passed Senate Bill No. 375 aims to cut urban sprawl by reducing vehicle miles travelled (VMT) through land use and transportation planning by setting regional GHG targets, developing a sustainable community strategy, and addressing regional housing and transportation planning together.

"In an era of climate change, if a community wants to be more sustainable, it's going to have to think beyond its boundaries. In the Bay Area that means building vibrant, compact neighborhoods served by reliable transit, so that the region's scenic and natural resources remain intact and as beautiful as ever."

Kenneth Kirkey, Planning Director, Association of Bay Area Governments

Figure 5. Relative Contributions to Regional CO_2 Emissions from Energy Sources, 2007



Relative contributions from different energy sources to overall CO_2 emissions in the Silicon Valley region (Santa Clara, San Mateo, Alameda, and Santa Cruz Counties). Data sources: California Energy Commission and California Department of Transportation.

Figure 6. Commuting Patterns in the San Francisco Bay Area

	In 2007, percentage of people who...			From 2000 to 2007 change in the number of workers...	
Counties	...drove alone	...car-pooled	...used public transit	...using transit	...driving alone
Alameda	67%	10%	11%	1%	2%
Contra Costa	71%	12%	9%	3%	8%
Marin County	67%	8%	7%	-30%	0.1%
Napa	71%	15%	2%	23%	8%
San Francisco	39%	7%	33%	5%	-5%
San Mateo	70%	10%	10%	39%	-3%
Santa Clara	78%	10%	3%	-3%	1%
Solano	76%	14%	3%	18%	9%
Sonoma	72%	13%	2%	-11%	-2%

Source U.S. Census Bureau MERCURY NEWS

Changes in commuting patterns for the nine San Francisco Bay Area counties from 2000 to 2007 according to U.S. Census Bureau data. Source: Mercury News, 9/30/2008.

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Selection of Partner Achievements

Outstanding CO_2 reductions

3Degrees Group • 100 percent carbon neutral, with offsets for all emissions including business travel and employees' homes.

Acterra • 100 percent carbon neutral, using photovoltaics (PV), PaloAltoGreen, and offsets for natural gas.

Adobe Systems Incorporated • Emissions are 29 percent below 1999 levels in the East and West Towers.

City of Morgan Hill • Lighting retrofit completed at three of its buildings that will reduce CO_2 emissions by more than 40 tons per year.

CV Therapeutics, Inc. • Reduced energy-related CO_2 emissions by approximately 450,000 pounds from 2006.

Integrated Archive Systems • Building is carbon neutral with the purchase of 100 percent of electricity through PaloAltoGreen.

Integrated Design Associates, Inc. • New headquarters completed in 2007, which is a retrofit of an existing building, is a zero carbon emissions building.

Minerva Consulting • 100 percent carbon neutral using PaloAltoGreen for electricity, offsets for natural gas and travel, and electric vehicles.

NASA Ames Research Center • Reduced electricity and natural gas use by 33 percent from 1990 to 2007, representing over 27,500 tons of CO_2 emissions avoided.

Pacific Gas & Electric Company • Buildings are carbon neutral using offsets through ClimateSmart™.

Sierra Club Loma Prieta Chapter • 100 percent carbon neutral using PVs and carbon offsets for commuting-related emissions.

Outstanding energy savings

City of San José • Reduced electricity use at the Water Pollution Control Plant from 10.5 MW/month to 8.1 MW/month, a 23% savings, since 1999.

GreatMall • Saved 860,000 kWh by modifying HVAC set points on rooftop units and conducting lighting retro-commission.

Integrated Design Associates, Inc. • New headquarters completed in 2007 uses net zero energy off the grid.

LifeScan, Inc. • Annual electricity and natural gas consumption will decline by over 750,000 kWh and 52,000 therms respectively by 2007 projects at its Milpitas facility.

Lockheed Martin Space Systems Company • Saving over four million kWh and over 230,000 therms of natural gas annually with upgraded HVAC controls at one of its facilities.

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NetApp • Will save more than 3.4 million kWh as a result of energy efficiency projects implemented in 2007.

Seagate • Reduced electricity use per production unit by 20 percent since FY 2005.

Silicon Valley Microelectronics • Saved roughly 21,000 kWh and $1,500 in energy costs without any discernible difference in building lighting by reducing the number of lamps in the building's light fixtures.

Notable on-site renewable energy generation

Acterra • 15 percent of its electricity is provided by rooftop PV system.

Akeena Solar • 10 percent of its electricity is provided by on-site solar system.

City of Mountain View • 90 kW PV system on parking structure will save city $18,000 annually.

eBay • Installed 650 kW PV system covering 60,000 square feet of roof space at North First Street facility.

LJ Engineering and Manufacturing, Inc. • Has begun installing 82 kW PV system.

Santa Clara University • Installed 50 kW PV system projected to produce 80,300 kWh annually.

Silicon Valley Microelectronics • Installed 50 kW PV system.

Town of Los Altos Hills • 48 percent of the electricity consumed at Los Altos Hills' Town Hall was provided by PV system that produced 62,400 kWh.

Outstanding cost savings

Agilent Technologies • Received over $150,000 in rebates through energy efficiency and waste reduction projects.

City of Mountain View • Will save $18,000/year with 90 kW photovoltaic (PV) system on parking structure, and $20,750/year as a result of installation of high efficiency chiller in Civic Center.

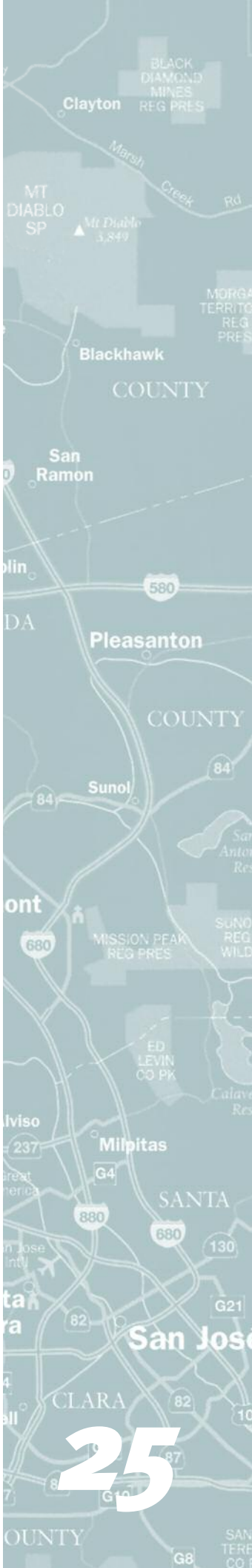
City of San José • Saved $435,000 in annual energy costs and earned over $162,000 in rebates by implementing energy efficiency projects in sixteen city buildings in 2007.

City of Sunnyvale • Saves $36,000 annually in energy costs after consolidation of two virtual server systems.

Hewlett Packard Company • Received more than $150,000 in rebates from energy efficiency projects at its Cupertino facility.

Northrop Grumman Marine Systems • Saved more than $320,000 in 2007 and more than $870,000 total since January 2005 as a result of energy efficiency programs.

Santa Clara University • Received $125,000 in rebates from Silicon Valley Power for its new 50 kW PV system.



The Valley: Leading Silicon Valley Sustainability Trends

SUSTAINABILITY TRENDS

Overview

After several years of working with Silicon Valley's leading organizations to create a more sustainable region, Sustainable Silicon Valley has learned a great deal about what works to reduce carbon emissions. In addition to a broad view of the most effective strategies for Silicon Valley, Sustainable Silicon Valley's experience with the leading businesses, governments and agencies has led to some compelling conclusions about future trends. The following are our "Top 10 predictions for 2009."

Top 10 Predictions for 2009

1. New focus on supply chain, life cycle analysis and extended producer responsibility

After the rolling blackouts of 2000 and 2001, California and the Valley became uniquely focused on energy usage, to ensure reliability and business continuity. Many Valley organizations that are committed to reducing their carbon footprint, and have already implemented energy efficiency and demand response measures, are now trending towards green life cycle practices. This takes many forms, whether it is the implementation of environmentally preferable procurement policies (EPP), advocating for extended product responsibility (EPR) or greening their supply chain. Shipping, packaging, product design, product use and end of life disposal all contribute significantly to a carbon footprint. Organizations will be adopting and implementing EPP and EPR policies with this in mind. Silicon Valley companies are leading the way by offering EPR for their products, including Dell's free take-back program and Apple's offer to recycle used computers for all who purchase a new or Apple Certified refurbished computer or monitor. Local governments are increasingly supporting this effort, with some advocating for EPR as a legislative and procurement priority. The California Integrated Waste Management Board's adoption of EPR framework legislation as a strategic goal and as a policy approach will only hasten this trend.

At least seven Sustainable Silicon Valley Partners are greening their supply chain and six of them are conducting life cycle analysis on their products to identify opportunities for reducing CO_2 emissions.

2. City General Plans are laying the path towards greener public infrastructure

Cities that have developed climate protection plans or have set environmental goals realize they need to green their city's built environment if they are going to meet their targets. This trend has certainly been catalyzed by Attorney General Jerry Brown's threat to sue San Bernardino County if they did not consider the global warming impact of their land use decisions as laid out in their General Plan. Sustainable Silicon Valley expects to see more climate-friendly development strategies in municipal General Plans, such as those

Redwood City's #6 pump station is handling recycled water. All above-ground fixtures that handle recycled water are required to be purple in color or have purple tags saying recycled water. This color coding is to avoid accidental misuse of recycled water.

which identify high performance infrastructure improvements that will make low-carbon transport a reality. We see cities exploring the installation of: segregated multi-modal lanes in their downtown that will accommodate bike, car and transit lanes; smart street lights (which enable remote lighting, dimming and turning off to save energy); public plug-in sites for electric vehicles and green building initiatives; and transit-oriented development (TOD). Cities that are planning for TOD are receiving grants from the regional government agencies through the FOCUS program.[13] The federal and state government are positively affirming this trend by issuing grant monies that will fund the study and implementation of such projects (e.g., Marin County was the recent recipient of a $25 million grant by the Non-motorized Transportation Pilot Program sponsored by Congress). An added benefit is that greening of public infrastructure provides health and recreational benefits to Silicon Valley residents.

3. Fleets will continue to "green up"

Despite the knowledge that vehicles are continuing to raise emission levels in the Valley, gasoline use and vehicle miles traveled are continuing to grow. Even though individuals are failing to drive less, Sustainable Silicon Valley anticipates that concerned companies will increasingly focus on green fleets in 2009. Greening fleets entails activities in three major areas: maintaining fleets to optimize fuel efficiency (e.g., inflate tires to right levels, reduce drag on vehicles by keeping heavy items out of vehicle, etc.); procuring fuel-efficient vehicles or zero emission vehicles (ZEVs); and sourcing cleaner fuels, such as compressed natural gas (CNG) or hydrogen. Many companies and cities (e.g., for Lockheed Martin, 33 percent of their fleet is hybrid, and the City of San José has a goal that 100 percent of its cars run on alternative fuels in its 15 year plan), are procuring more fuel efficient vehicles once cars are retired and replaced. There are also financial incentives to spur the greening of fleets, such as those from government agencies like the California Air Resources Board, and private companies (e.g., Google's $5,000 hybrid incentive), and a host of policies—AB 1493 (which requires automakers to reduce GHG emissions from automobiles by 30 percent over the next decade), the Low Carbon Fuel Standard, the Fuel Efficient Tire Program, and AB 32 (the Global Warming Solutions Act of 2006)—that will catalyze action. As a consequence, Sustainable Silicon Valley expects a significant expansion in alternative vehicles such as plug-in hybrids, fuel cell vehicles, and high efficiency diesel and CNG vehicles that act as a "bridge" technology.

The City of Los Gatos is switching to biodiesel for all heavy-duty diesel-fueled trucks and equipment.

4. Expansion in sub-metering for leased office spaces

Until recently, leased office space tenants—which make up 60 percent of commercial stock—were limited in the scope and progress they could achieve on energy efficiency and in green programs. The California Public Utilities Commission has ruled that public utilities must sub-meter for individual tenants if requested to do so. In addition to connecting tenants more closely to energy use, this practice will open up new opportunities to work with

[13] FOCUS is a program that brings together Bay Area local governments and the four regional agencies—Association of Bay Area Governments, Bay Area Air Quality Management District, San Francisco Bay Conservation and Development Commission, and the Metropolitan Transportation Commission—to create complete livable communities. See *www.bayareavision.org* for details.

landlords on capital improvements to improve energy efficiency. Sub-meters allow building owners to determine actual tenant energy consumption that results in more fair and accurate billings, and can allow for an examination of load profiles, thus enabling changes in operating practices that can reduce energy consumption and preserve capital. Many businesses in Silicon Valley occupy leased facilities, and most of these still do not have their own utility meters. They lack quantitative feedback about the effectiveness of their programs to reduce energy use. Sub-meters have not yet become widely requested of utilities, but Sustainable Silicon Valley predicts that 2009 will see sub-metering become a more widespread practice.

5. Public transportation needs will outpace public transportation infrastructure

While general plans are supportive of greening goals, public transportation is not keeping pace with the needs of the public for inexpensive, reliable and enjoyable transit. In fiscal year 2008, Caltrain carried 11.96 million riders, up 8.6 percent from the previous year—the highest annual ridership of the railroad's 145-year history. The increase in ridership presents other challenges, as some trains become more crowded during peak periods, and the railroad cannot do much more to expand its capacity or the frequency of its service until it completes electrification of its system. Bay Area Rapid Transit (BART) suffers from similar challenges. BART is averaging 370,000 riders per day, about 15,000 more than a year ago. Unable to cope with demand, BART is considering charging more during peak hours, which is both unpopular with riders and antithetical to the mission.[14] Altogether, Sustainable Silicon Valley predicts a challenging, transformative 2009 for our public transportation agencies, which will be forced to get creative about transportation solutions and to think in different terms to meet increasing ridership and limited capacity.

6. Increased water recycling

Recycled water will become an increasingly valuable resource in Silicon Valley in years to come. The Santa Clara Valley Water District—the Valley's main water supplier—adopted a goal in 2001 to make up 10 percent of its total water supply from recycled water sources by 2020. To meet this target, it has encouraged communities from Gilroy to Palo Alto to reuse their water for landscape irrigation, industrial processes, and other non-potable (non-drinking) purposes instead of discharging it to the ocean or the San Francisco Bay. South Bay Water Recycling[15] has distributed over 23 billion gallons of water to more than 500 customers in Milpitas, Santa Clara and San José, including Sustainable Silicon Valley partners like Intel and Sun Microsystems. This water reuse is projected to double over the next 10 to 15 years, as more Silicon Valley industries substitute recycled water for drinking water in cooling towers and manufacturing. It will also become increasingly common to see new developments designed to use recycled water not only for irrigation, but also for

Controlled, directional sprinklers make better use of water. Photo courtesy of the Santa Clara Valley Water District.

[14] Mara, Janis. "BART riders in no rush to pay proposed peak fares." Contra Costa Times. 17 September 2008. *http://www.contracostatimes.com/ci_10491156*

[15] South Bay Water Recycling (SBWR) is a recycled water system serving the cities of San José, Milpitas, and Santa Clara. Details at *www.sanjoseca.gov/sbwr/about.htm*

non-potable indoor uses like flushing toilets. While climate change is predicted to increase the frequency of droughts in the long term, already this summer California's snowpack was only 67 percent of normal, which led Governor Schwarzenegger to declare a drought in California. Shrinking water supplies, combined with doubling water rates from 2008 to 2015 region-wide due to upgrades to the water delivery systems,[16] should encourage more companies to install water efficient technology in their buildings and use recycled water for irrigation.

7. Exponential growth of Power Purchase Agreements (PPA)

Power Purchase Agreements (PPAs) are long-term contracts to buy power from a company that produces electricity. Financed by such agreements, non-utility owned power producers (e.g., companies such as Recurrent Energy, SunEdison and MMA) install and maintain on-site renewable energy generation (largely solar) and supply the electricity to the property owner, leasor or the electric utility at a predictable, fixed rate. PPAs have become increasingly popular, as both residential and corporate customers escape large capital investments, while still reaping the benefits of on-site renewable energy generation. In fact, Greentech Media researchers forecast that the PPA financing tactic will drive 75 percent of commercial and industrial solar sales in 2008 and 2009.[17]

With the combined pressures of economy and the environment on Silicon Valley businesses, and the renewal of the Investment Tax Credit (ITC) for solar financing at the federal level, Sustainable Silicon Valley expects to see PPAs increase in the Valley significantly in 2009. At least four Sustainable Silicon Valley partners have entered into PPAs in the last year.

8. Continued growth of green jobs

In the U.S., 5.3 million jobs have been created by environmental management and protection. By 2010, green employment is expected to reach 5.8 million jobs.[18] Growth in "green establishments," businesses producing products and offering services that directly or indirectly reduce environmental degradation, and specifically, the generation of greenhouse gas emissions, is taking place throughout the State. Nowhere is this trend more concentrated than in Silicon Valley. Since 2000, the number of Silicon Valley's green jobs increased by 41 percent compared to 17 percent in the rest of the State.[19] This suggests that the region's green establishments are larger. Of the Valley's green establishments, 43 percent are concentrated in energy generation (e.g., solar and wind product manufacturing and installation services) and 39 percent in energy efficiency (e.g., manufacturing and sales of products and materials that conserve energy).[20] Sustainable Silicon Valley predicts ongoing growth in green jobs in Silicon Valley, ranging from solar-panel installers and software engineers to wastewater treatment and hazardous materials management, and that these jobs will be open to all sectors of society.

[16] Scott, Julia. "No new water for Bay Area residents through 2018." San Jose Mercury News. 30 September 2008. *http://www.mercurynews.com/breakingnews/ci_10602997*

[17] Barron, Rachel. "Power-Purchase Agreements to Spike." Greentechmedia. 14 February 2008. *http://www.greentechmedia.com/articles/power-purchase-agreements-to-spike-591.html*

[18] Le Beau, Christina. "Jobs of the Future: A New Green World." Workforce Management. September 2008. *http://www.workforce.com/archive/feature/25/74/09/index.php?ht=*

[18] Silicon Valley Leadership Group. "2009 Silicon Valley Projections, Clean and Green." 2008. *http://svlg.net/press/library/projections_2009.pdf*

[20] Ibid.

SUSTAINABILITY TRENDS

9. An explosion in the growth of green teams, Eco VPs and CSOs

At current count, Sustainable Silicon Valley has identified approximately 60 cross-functional green teams that have sprouted up in the last year at some of the Valley's brand name corporations—Yahoo, eBay, HP and Cisco, to name a few. As more companies continue to feel the pressure—from both internal and external sources—to develop an integrated green program, Sustainable Silicon Valley expects a 100-percent increase in the growth of green teams and leadership positions for green experts within corporations, including titles such as Vice President of Eco Responsibility, and Chief Sustainability Officer (CSO). While greening responsibilities have historically fallen on the shoulders of Environmental, Health and Safety (EH&S) professionals, the Valley is moving beyond compliance to leadership, and hiring will follow suit. Both green teams and executive managers will increasingly be asked to direct corporate policies on improving energy efficiency, reducing pollution and waste, conserving critical resources and ensuring compliance with regulations.

> Four SSV partners recently reported hiring executive level environmental staff, including a Chief Sustainability Officer.

10. Cleantech will become an important part of greening Silicon Valley

Cleantech—new knowledge-based products or services that improve operational performance, productivity, or efficiency while reducing costs, raw material inputs, energy consumption, greenhouse gas emissions, waste, or pollution—has brought a wave of financial opportunity to Silicon Valley's entrepreneurs. In Cleantech Venture Capital investments in 2007, Silicon Valley alone accounted for 62 percent of California and 21 percent of U.S. investment.[21] During 2006, investment in the Valley expanded by 94 percent and in the rest of the State by only 7 percent.[22] Just as the Valley has seen on-site generation of renewable energy to manage carbon footprints (e.g., Applied Materials' and Google's record-setting solar arrays), Sustainable Silicon Valley anticipates a proliferation of related "clean and green" technologies will infuse the Valley as well. Examples include turning to direct current (DC) systems for data centers, and even a growth in fuel cells and other less polluting forms of back up power (e.g., natural gas fired generators).[23] However, many start-ups struggle to operate above minimum environmental compliance performance levels. In order to achieve credibility and market-share, these new Cleantech firms will need to come up to speed quickly and "walk the talk." Sustainable Silicon Valley expects a new focus on working with emerging Cleantech companies to green their internal procedures and approach business from a triple bottom line perspective.

Demonstration photovoltaic solar installation atop Sunnyvale's Fire Station No. 2.

[21] Joint Venture Silicon Valley. "2008 Index of Silicon Valley." 2008. *http://www.jointventure.org/publicatons/index/2008Index/index.html*

[22] Ibid.

[23] There are a total of 2,272 back-up generators (number of permitted generators in San Mateo and Santa Clara County according to the Bay Area Air Quality Management District (BAAQMD) in Silicon Valley, almost entirely diesel-powered.

Imagining Our Future: Reinventing Ourselves and Renewing Our Commitment to Future Generations

IMAGINING OUR FUTURE

Reinventing Ourselves and Renewing Our Commitment to Future Generations

Sustainable Silicon Valley's vision and enduring commitment is to create a more sustainable Bay Area. Our initial approach has been to use an environmental management system as a regional sustainability tool. After community input identified energy efficiency and GHG emissions as a top priority, Sustainable Silicon Valley set an ambitious target for CO_2 emissions reductions in 2003.[24] Sustainable Silicon Valley partners have made significant progress towards this target, with some reporting reductions in CO_2 emissions up to 27 percent from 2000–2007.

However, sustainability extends beyond climate change. Creating a sustainable future means creating a positive legacy we will pass to our children and their children. Within the Valley, despite a wide range of public and private investment and an exhaustive array of regulations, a healthy environment for both people and other species has still not been achieved. In keeping with its original vision, Sustainable Silicon Valley is renewing its pledge to lead the Valley towards a healthier environment, a vibrant economy and a socially equitable community.

In the current economic climate, many organizations are facing significant financial constraints. It is not uncommon for organizations to compete for scarce resources in such times, but we will encourage cooperation and collaboration instead. The Silicon Valley region is home to many experienced, talented and dedicated organizations making a difference on these and many other issues. Sustainable Silicon Valley will work collaboratively with public, private, community, labor, and faith-based organizations to improve the sustainability of our region, including focusing on the environmental priorities we identified with the Silicon Valley community.

Sustainability Initiatives and Key Strategies

Sustainable Silicon Valley will pursue two strategic initiatives for a sustainable future:

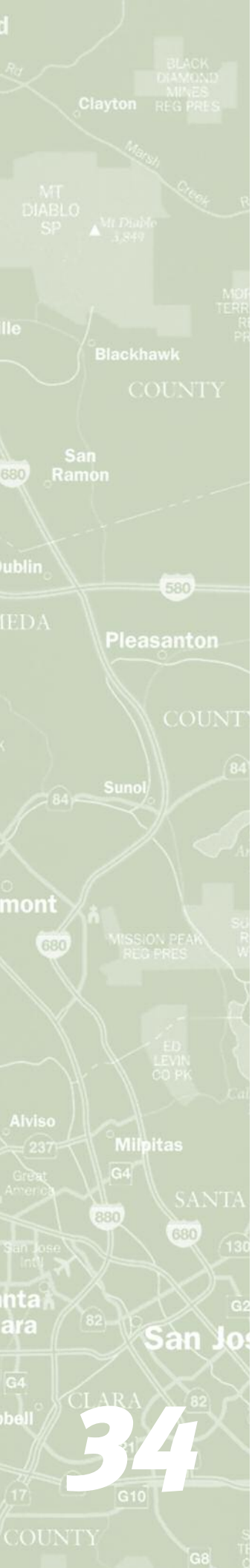
1. **Catalyze a Regional Climate Action Plan for Silicon Valley**
2. **Develop New Management Frameworks for Silicon Valley's Most Significant Environmental Pressures**

Sustainable Silicon Valley will collaborate with partners throughout the region to put these initiatives into action.

Strategic Initiative 1: A Regional Climate Action Plan for Silicon Valley

Silicon Valley needs a coordinated action plan to address climate change. As this report highlights, individual cities, companies, universities, and other organizations have taken significant actions to reduce their energy consumption and CO_2 emissions. However, many best practices proven to be effective by individual Sustainable Silicon Valley partners have not yet been widely adopted. Sustainable Silicon Valley believes that the next step for Silicon Valley is a voluntary action plan that identifies the key practices for all parties to adopt to put the region on a path to significant CO_2 reductions.

[24] Sustainable Silicon Valley's target is a 20 percent reduction in CO_2 emissions by 2010, based on 1990 levels.



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Several voluntary initiatives have emerged to engage different sectors of the community in addressing climate change issues. The Bay Area Climate Change Compact commits the three largest Bay Area cities, San José, Oakland and San Francisco; the four regional agencies including the Association of Bay Area Governments, the Bay Area Air Quality Management District, the Bay Conservation and Development Commission, and the Metropolitan Transportation Commission;[25] as well as the leading business association in the Valley, the Silicon Valley Leadership Group, to take specific actions and obtain measurable results around ten goals that will reduce GHG emissions.

Sustainable Silicon Valley has cooperated with ICLEI-Local Governments for Sustainability, to provide access to cost-effective climate reporting tools. Twenty-nine cities in Silicon Valley are using these tools to report their CO_2 emissions reductions.[26]

We view these as very positive steps. But we believe that effective action on climate change must also include the smaller cities, more businesses, including small and medium sized business, and environmental, community, labor, and faith-based organizations that are such vital contributors to Silicon Valley's innovation. Sustainable Silicon Valley is uniquely positioned to ensure that these organizations can play an effective role in coordinated action to address climate change.

We have demonstrated the power of voluntary collaboration among business, government, and community organizations. Sustainable Silicon Valley partner organizations have achieved significant reductions in energy use and CO_2 emissions, without waiting for leadership from Sacramento or Washington DC. Working with the Bay Area Climate Change Compact organizations and other climate change efforts, Sustainable Silicon Valley and its partner organizations will provide a consistent and constructive program for coordinated action to address the Valley's most significant environmental problem.

Strategic Initiative 2: Develop New Management Frameworks for Silicon Valley's Most Significant Environmental Pressures

Sustainable Silicon Valley will develop implementation frameworks for the top six environmental pressures identified by our stakeholders.[27] These include:

A. Use of energy from non-renewable sources measured by CO_2 emissions
B. Use of fresh water
C. Urban sprawl
D. Habitat loss and fragmentation
E. Use of non-renewable raw materials
F. Discharges of toxic chemicals to the air

A. Energy from non-renewables

Challenge: Non-renewable energy sources such as petroleum, natural gas and coal are by definition limited, and will be increasingly so, due to rising global demand. By 2015, growth in the production of easily accessible oil and gas will not match the projected rate of demand

[25] Adoption of the Compact by the four regional agencies listed is pending as of date of report printing.
[26] Source: *http://www.jointventure.org/programs-initiatives/climateprotection/climateprotection.html*
[27] More information on SSV's stakeholder process at *http://www.sustainablesiliconvalley.org/about.htm*

IMAGINING OUR FUTURE

growth.[28] Non-renewable sources also emit carbon dioxide and toxic air pollution as defined by the US Environmental Protection Agency. Silicon Valley needs to reduce our reliance on non-renewable energy sources and replace them with renewable sources.

> Worldwide, oil fields are declining at an annual natural rate of 9.1 percent and, even with investment to boost production, are still declining at 6.4 percent.[29]

Sustainable Silicon Valley Response: We will pursue two primary strategies to mitigate this pressure:

- Energy efficiency: We will continue to work toward the regional goal of reducing regional CO_2 emissions by 20 percent by 2010 using a 1990 baseline. We will also continue to promote energy and fuel efficiency as a strategy for meeting that goal.
- Renewable energy sources: We will work with partner organizations to increase the use of renewable sources of energy, through improved access to renewable energy sources and other means.

B. Water supply

Challenge: Silicon Valley continues to increase its water consumption, while climate change and development pressures decrease the reliability of both local and imported water supplies. Anticipated climatic changes, such as rising temperatures, reduced snowpack, and rainfall pattern changes combined with population and economic growth increases in the region will decrease the local and imported reliability of our water supply.

Aerial view of aqueduct, California.

Sustainable Silicon Valley Response: Sustainable Silicon Valley will bring together Silicon Valley water and wastewater utilities, prominent businesses, cities, counties, and environmental and community groups, and faith-based organizations to work toward a goal of overall water sustainability. Our goal will be to significantly reduce Valley water consumption by 2020.

C. Urban Sprawl

Challenge: Urban sprawl is the low-density development of homes, shops and roads on rural or agricultural lands at the urban boundary. It is a significant contributor to environmental problems such as energy consumption, habitat fragmentation and air pollution. While land use is locally determined, it demands cross-jurisdictional collaboration. For residents living in, and businesses operating in the Bay Area, housing, jobs and transportation systems traverse local government boundaries. Given that these three factors extensively shape land use, collaboration on land use by local governments is required. Recent passage of SB 375 provides an opportunity for regional collaboration to reduce urban sprawl.

[28] Shell Oil Company. "Shell Energy Scenarios to 2050," 2008. *http://www.shell.com/home/content/aboutshell/our_strategy/shell_global_scenarios/dir_global_scenarios_07112006.html*

[29] Hoyos, Carola. "The dawn of a disturbing new reality." Financial Times. 3 November 2008. *http://www.ft.com/cms/s/0/20d57524-a947-11dd-a19a-000077b07658.html*

IMAGINING OUR FUTURE

Sustainable Silicon Valley Response: As with all our efforts, Sustainable Silicon Valley will advocate for voluntary collaboration to reach our common goal of a more sustainable region. Sustainable Silicon Valley will work with cities, businesses, environmental and community groups, and labor and faith-based organizations to identify the best opportunities to address urban sprawl.

D. Habitat loss and fragmentation

Challenge: Our climate, geology, and topography make California one of the world's richest biological regions, home to the second greatest number of threatened and endangered species of any US state. The economic growth of Silicon Valley threatens many important species and habitats in the area through the development of its land. The Association of Bay Area Governments projects that between 2000 and 2020, Santa Clara County will gain 261,400 new residents and 231,000 new jobs, more than any other county in the greater San Francisco Bay Area. Development of rural and agricultural land eliminates the habitat of many species or greatly reduces their range, thereby contributing to habitat decline. Species depend on each other for their survival (e.g., snakes feed on mice), and therefore the loss of one species due to habitat loss directly contributes to the loss of other species.

The Alameda Whipsnake is one of the local area reptiles listed on the endangered species list.

Sustainable Silicon Valley Response: Habitat loss and fragmentation is closely related to development, and therefore our response will be synergistic with our Urban Sprawl strategy. Sustainable Silicon Valley will work with organizations in the public and non-government sectors that focus on habitat conservation efforts in Silicon Valley. As our expertise does not lie in habitat management, we will work with Habitat Conservation Plan/Natural Community Conservation Plan (HCP/NCCP) projects in Silicon Valley that focus on these issues to ensure that habitat conservation is a priority in regional planning for sustainability.

> *"Santa Clara County and San Mateo County have some of the most important wildlife corridors in the Bay Area. But these precious habitat lands are threatened; over 85,000 acres in the two counties face serious development threats. The good news is that growth can be accommodated in our existing cities, protecting the essential connections that allow both people and wildlife to move across the landscape."*
>
> ***Jeremy Madsen,*** Executive Director, Greenbelt Alliance

E. Use of non-renewable raw materials

Challenge: If industry and society does not move toward a more cradle-to-cradle approach to products, continued economic growth and development will put increasing pressure on supplies of non-renewable raw materials, including ores of metals such as iron, copper,

aluminum, and zinc, and other industrial materials. The globe is witnessing a decline in the grade of such materials requiring more energy to be needed to extract them from the earth and refine them for use. Furthermore, discarding products in landfills generally renders the eventual recovery of such materials from these sites difficult and economically unattractive. We need to develop environmentally sustainable alternatives to these raw materials. The recent growth in green building provides hope for a much less resource intensive path for development.

Sustainable Silicon Valley Response: Sustainable Silicon Valley will continue to work with partner cities, businesses, and other organizations to promote development decisions, purchasing decisions, and building codes that promote more efficient use of materials, and promote greater reuse and recycling of materials.

"It is important to recognize that there are two parts to the 'story' of using non-renewable materials: they first need to be obtained from the environment (through extraction, processing, and transportation) and then they ultimately return as waste to the environment in landfills and other disposal sites. In order to break this cycle, materials need to be recaptured in a meaningful way at end-of-life, and recycled."

Jay Bolus, Vice President, Technical Operations,
McDonough Braungart Design Chemistry, LLC

F. Discharges of toxic chemicals to the air

Challenge: Silicon Valley continues to be home to significant stationary and non-stationary sources of toxic air pollution. Although there has been progress in improving air quality overall (since the 1970s, pollutants such as CO, SOx, NOx, and lead have declined) and there is reduced frequency and severity of ozone and particulate matter (PM) exceedances of regulatory limits, there are still significant concerns. Reducing emissions of ozone-forming chemicals and fine particulate matter to attainment levels, and reducing public exposure to air toxics are priorities for the Silicon Valley region, as these pollutants contribute to serious health issues such as asthma and cancer.

Sustainable Silicon Valley Response: Sustainable Silicon Valley will work with partner organizations to ensure that the Bay Area Air Quality Management District (BAAQMD) 2009 Clean Air Plan includes specific and appropriate plans to address the most critical air quality issues quickly and effectively. We will also continue to educate our partners about toxic air pollutants and encourage them to reduce their emissions of these pollutants alongside their CO_2 emissions.

"While air quality and smog levels in our region have improved greatly over the last several decades, we still need to be vigilant about the harmful effects of toxic air contaminants like particulates from diesel combustion. Protecting the health of our residents and meeting federal air quality standards will require awareness, investment, and innovation. I'm optimistic that Silicon Valley will continue to be at the forefront of the technology and policy efforts that lead us to important environmental and health benefits."

Jack Broadbent, Executive Officer, Bay Area Quality Management District

Sustainable Silicon Valley Pledge to Participate

(This is a sample letter written on the letterhead of the pledging organization and signed by a responsible officer of the organization.)

DATE

Mr. Rick Row
Executive Director
Sustainable Silicon Valley
224 Airport Parkway, Suite 620
San Jose, CA 95110

Dear Mr. Row:

(Organization) is pleased to support the efforts of Sustainable Silicon Valley (SSV) and hereby commits to take part in SSV's Carbon Dioxide (CO_2) Emissions Reduction Initiative.

The following facilities are included in this commitment:

1. ___(address)_____
2. ___(address)_____
3. ___(address)_____

As we make this commitment we understand that by May 31, (year), we will prepare a report for the facilities identified above. In this report we will identify:

1. a baseline reporting year for each facility, 1990 or later;
2. a goal for CO_2 emissions reduction (percentage and target year) for each facility;
3. a normalizing factor (optional) for each facility;
4. either the energy used at each facility in the form of electricity, natural gas, and fleet fuel;
5. OR the carbon dioxide emissions for each facility as calculated by another reporting mechanism that we will identify in our report to Sustainable Silicon Valley; and,
6. a brief description (one-two paragraphs) of some (two-five) of the key actions taken that led to the decreasing emissions of CO_2. We understand that this information will likely be shared with others as "best practices" and included in Sustainable Silicon Valley's annual reports with or without (at our option) attribution.

In our first report, we will include data for each year back to our baseline year. In subsequent reports, we will add the most recent year's data.

The information we submit will be used in the Sustainable Silicon Valley report published annually

We understand that the Sustainable Silicon Valley Carbon Dioxide Emissions Reduction Initiative is a voluntary project; there are no sanctions for failing to meet our goal. Nonetheless, we will make a concerted effort to reach the goal established.

The following person is the point of contact for our organization for this project: (name), (address), (telephone), and (email).

Sincerely,

Signature

Typed name and title,
Senior Management Representative

SUSTAINABLE SILICON VALLEY

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